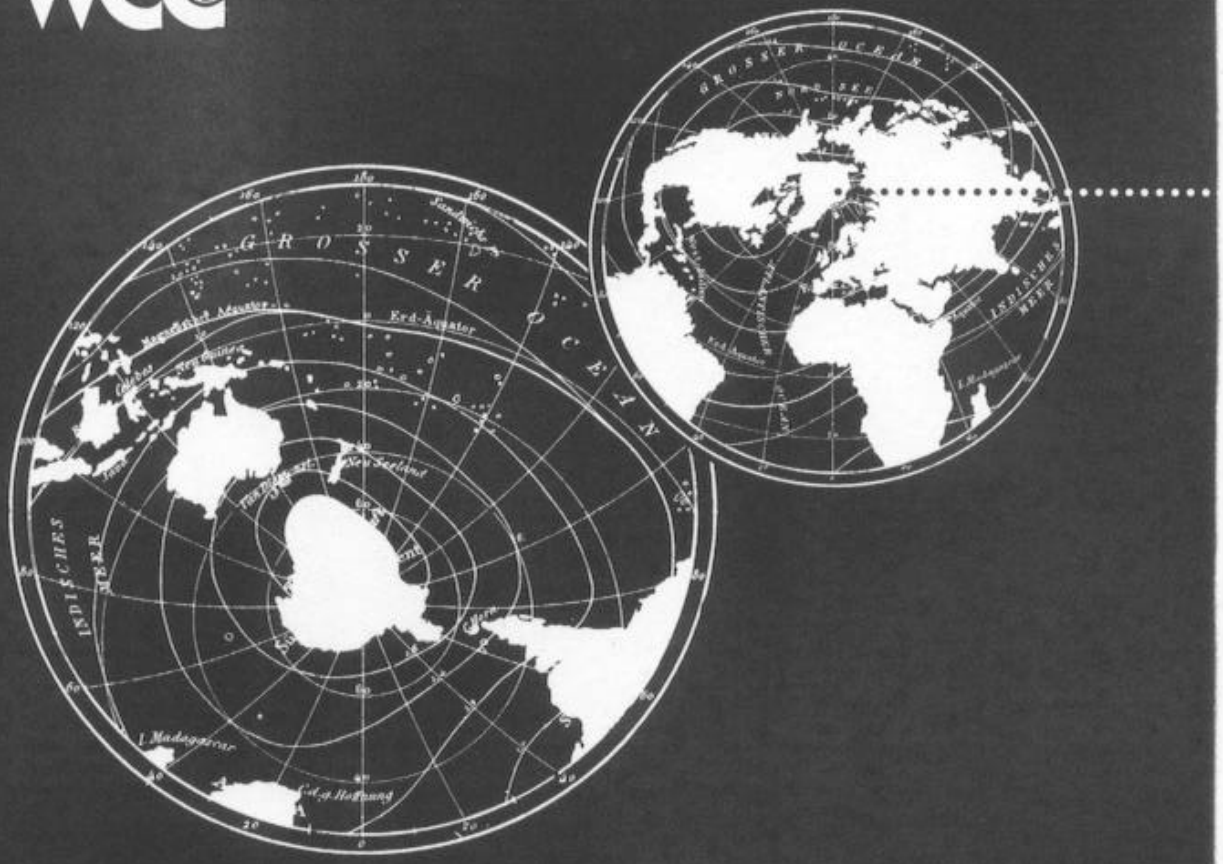
USAID

WEC

WORLD ENVIRONMENT CENTE



FINAL REPORT FOR THE LOCAL ACCIDENT MITIGATION AND PREVENTION (LAMP) PROGRAM IN MEXICO

SUBMITTED TO:

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)
OFFICE OF FOREIGN DISASTER ASSISTANCE (OFDA)

SUBMITTED BY:

WORLD ENVIRONMENT CENTER (WEC)

FEBRUARY, 1997

COOPERATIVE AGREEMENT AOT-2515-A-00-2125-00

Table of Contents

Acronyms

ANIQ	Asociación Nacional de la Industria Química (Mexico) [National Association of the Chemical Industry]
ALOHA	Areal Locations of Hazardous Atmospheres
APELL	Awareness and Preparedness for Emergencies at the Local Level
ARCHIE	Automated Resource for Chemical Hazard Incident Evaluation
ASTDR	Agency for Toxic Substances and Disease Registry (U.S.)
CAMEO	Computer Aided Management of Emergency Operations
CCPA	Canadian Chemical Producers Association
CDC	Centers for Disease Control (U.S.)
CENAPRED	Centro Nacional de Prevención de Desastres (Mexico) [National Center for the Prevention of Disasters]
CEPAP	Chemical Emergency Preparedness and Accident Prevention
CEPPO	EPA Chemical Emergency Preparedness and Prevention Office
CLAM	Comité Local de Ayuda Mutua [Local Committee for Mutual Assistance]
CMA	Chemical Manufacturers Association
DOT	Department of Transportation (U.S.)
EPA	United States Environmental Protection Agency (U.S.)
FEMA	Federal Emergency Management Association
LAMP	Local Accident Mitigation and Prevention
LEPC	Local Emergency Planning Committee
MIACC	Major Industrial Accidents Council of Canada
NOAA	National Oceanic and Atmospheric Administration (U.S.)
OFDA	Office of Foreign Disaster Assistance (U.S.)
PEMEX	Petroleos Mexicanos
SCT	Secretaria de Comunicaciónes y Transportes (Mexico) [Secretariat for Communication and Transportation]
SCRI	Modelos Atmosféricos para Simulación de Contaminación y Riesgos en Industrias [Atmospheric Models for the Simulation of Industrial Pollution and Accidents]
SEGOB	Secretaria de Gobernación (Mexico) [Secretariat of the Interior]
SEDESOL	Secretaria de Desarrollo Social (Mexico) [Secretariat for Social Development]
SEMARNAP	Secretaria de Medio Ambiente, Recursos Naturales y Pesca (Mexico) [Secretariat for the Environment, Natural Resources and Fishery]
TEEX	Texas Engineering Extension Service (Texas A&M University)
UNEP	United Nations Environmental Programme
USAID	United States Agency for International Development
WEC	World Environment Center

Foreword

This final report is submitted by the World Environment Center (WEC) in accordance with its Cooperative Agreement AOT-2515-A-00-2125-00 with the United States Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA) for a Local Accident Mitigation and Prevention (LAMP) program in Mexico. The overall objective of the five-year LAMP program has been to reduce the incidence and impact of major industrial, hazardous material transport or other technological accidents and disasters in selected industrial areas in Mexico. The project began officially in October, 1992 along with separate, parallel projects in India, Indonesia, and Thailand. The LAMP Mexico project is managed out of the WEC's office in Mexico City.

This report summarizes the impact of the LAMP Mexico project from 1992 - 1997 and discusses the activities, accomplishments, and lessons learned during the project. The report goes on to discuss the replication of LAMP initiatives in other industrial areas of Mexico and opportunities for further expansion in the years to come. In keeping with OFDA's Monitoring and Evaluation Manual, baseline indicators are referred to throughout the report as a benchmark against which all progress is measured.

WEC wishes to acknowledge the support and vision of USAID/OFDA for providing core funding for the LAMP program in India, Indonesia, Mexico, and Thailand.

Executive Summary

In October, 1992 the World Environment Center (WEC) initiated a cooperative agreement with the U.S. Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA) to establish a five year Local Accident Mitigation and Prevention (LAMP) program designed to mitigate man-made disasters and emergencies in high-risk industrial areas in India, Indonesia, Mexico, and Thailand. The goals of the LAMP program are founded on OFDA's prevention, mitigation, and preparedness (PMP) mandate — to save lives and protect economic investments.

The LAMP program builds on the United Nations Environment Program's (UNEP) Awareness and Preparedness for Emergencies at the Local Level (APELL) process and borrows key principles of developing safety and awareness capacity from this proven process. In conducting LAMP activities, WEC also relies on the expertise and experience of U.S. organizations such as the Environmental Protection Agency's (EPA) Chemical Emergency Preparedness and Prevention Office (CEPPO), the Centers for Disease Control's (CDC) Division of Environmental Hazards and Health Effects, the Department of Transportation (DOT), and other private and public sector organizations such as the Chemical Manufacturers Association (CMA), the Major Industrial Accidents Council of Canada (MIACC), and the United Nations.

LAMP's objective is to reduce the incidence and impact of major industrial, hazardous materials transport, or other technological accidents and disasters in selected areas of the target countries. LAMP activities are designed to foster sustainable improvements in emergency response and planning within the context of local conditions and restraints such as financial resources, motivation to improve safety systems, etc. In this way LAMP works to achieve realistic goals that improve safety in the short-term and remain effective in the long-term. Another key component of LAMP is that its impact can be replicated throughout the countries where it is implemented, not only at the individual industrial sites where activities are conducted. The program is intended to be a prototype that lays the groundwork for further preparedness and mitigation efforts that can continue following the LAMP program. In addition, the capacity building that occurs and the emergency response plans and infrastructure created by LAMP are also valuable in times of natural disaster.

The LAMP program has accomplished significant sustainable and replicable impacts in Mexico during the four plus years that the program operated. The following report explains the process of establishing the LAMP program in Mexico, summarizes LAMP activities and their impact, and concludes with a discussion of the lessons learned during the execution of the LAMP program.

The LAMP Mexico program was directed by Mr. Enrique Bravo Medina, WEC Country Manager, in concert with key leaders from industry and government at both the national and local levels. Mr. Bravo played an active role in guiding the development and planning

of Mexico's emergency response programs. In conjunction with these efforts, WEC conducted a series of interventions, including: the creation of accords with both the national government and the state of Veracruz; Awareness and Preparedness for Emergencies at the Local Level (APELL) workshops; Chemical Emergency Preparedness and Accident Prevention (CEPAP) training; risk assessment training; emergency preparedness training; hands-on training for first responders; technical training for medical personnel to improve their ability to effectively respond to chemical accidents or mass casualty situations; and, community awareness and Local Emergency Planning Committee (LEPC) development training. WEC also assisted and encouraged the execution of emergency response training drills, and provided constructive critical evaluation following each drill activity.

The active involvement of key stakeholders at both the national and local level is vital to the success of any LAMP program. In Mexico key constituents were: the Secretariat of the Interior, Civil Protection of the state of Veracruz; Local Committees for Mutual Assistance (CLAM) at the selected LAMP sites; the LEPC's created during the program; and the medical community of Veracruz. The LAMP program also depends upon the coordinating actions and technical experience of the Country Manager. Therefore, the achievements of the LAMP Mexico program are due to the cooperative efforts of these groups and their commitment to confront issues related to industrial accident mitigation and prevention. By working together the LAMP program and Mexican government and industry leaders have made progress on many fronts that will improve industrial safety and community awareness in the short-term while also leading to further improvements for years to come.

The LAMP Mexico program has led to improvements in accident prevention and mitigation and will continue to influence such efforts in Mexico for years to come. Through accords with the state of Veracruz and Mexico's Secretariat of the Interior, WEC has and will continue to have unparalleled access to key government and industry leaders in its efforts to promote the replication of the LAMP program to other important industrial areas of the country. In the LAMP program's final training activities, WEC is supporting the development of local emergency response capabilities through emergency response drills involving all key response groups, organizations, and stakeholders.

I. INTRODUCTION

This final report is submitted to the United States Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA) under World Environment Center's (WEC) Cooperative Agreement for the Local Accident Mitigation and Prevention (LAMP) program for Mexico. LAMP's objective in Mexico was to reduce the incidence and impact of major industrial, hazardous materials incidents in the urban and industrial centers of the state of Veracruz. The following sections summarize and discuss the accomplishments of the LAMP program in Mexico in an attempt to give OFDA and other interested readers an indication of the overall impact of the program.

Section II, **Implementation Approach and Site Selection**, discusses WEC's philosophy in implementing the LAMP program.

Section III, **Baseline Indicators**, discusses the technological risks in Mexico prior to the beginning of the LAMP program in October, 1992. This section also discusses the baseline abilities of local and national agencies to respond to technological accidents and other inherent risks associated with rapid industrial development.

Section IV, **Activities**, summarizes the major initiatives conducted during the LAMP program and the outcome of each.

Section V, **Impact, Sustainability and Replication**, discusses the overall importance of the LAMP program to Mexico and the reasons why Mexico will continue to benefit from the LAMP program in the years to come.

Section VI, **Lessons Learned**, comments on the process of conducting the LAMP program in Mexico as well as WEC's perspective regarding efforts to conduct similar programs elsewhere.

Appendices follow the body of the report.

II. IMPLEMENTATION APPROACH AND SITE SELECTION

The LAMP program objective is to reduce the incidence and impact of major industrial, hazardous maerials incidents in urban and industrial centers. World Environment Center's (WEC) approach in implementing this program involves three central components: 1) To build on the United Nations Environment Programme's (UNEP) Awareness and Preparedness for Emergencies at the Local Level (APELL) process; 2) To involve and develop government, industry and community leaders from the national and local levels; and 3) To maximize program impact by selecting the sites for tailored interventions to achieve the program objectives listed in Appendix E.

First, LAMP builds on the APELL process as a model for systematically increasing awareness and developing emergency management capabilities. The ten-step APELL process is illustrated in Figure 1. LAMP uses this proven formula for developing local capabilities and strengthens it by sustaining program interaction over the course of several years. Along with this sustained effort, LAMP brings additional resources to bare to enhance the APELL framework.

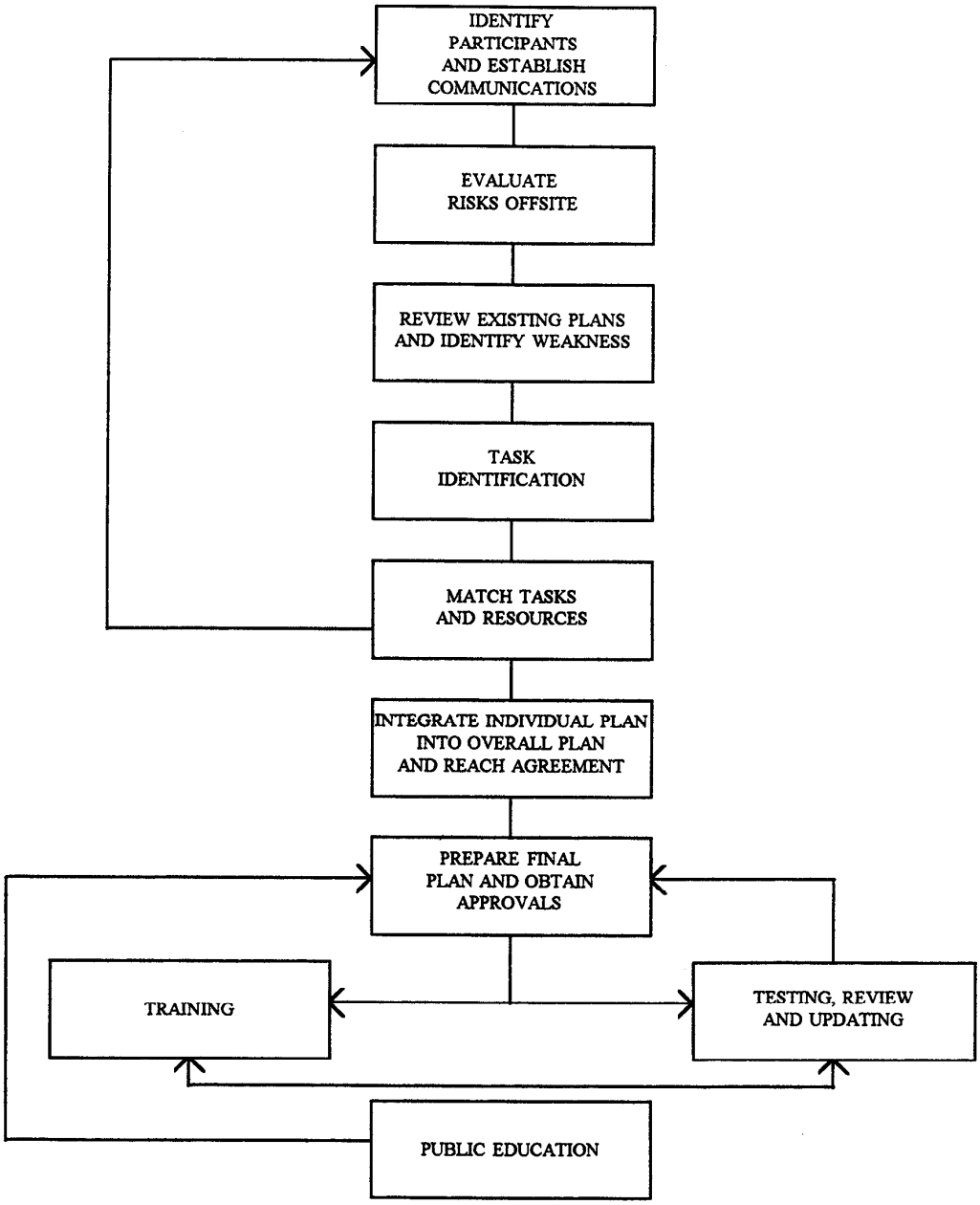
In Mexico, the LAMP program achieved its mandate in part due to the groundwork previously laid by UNEP/APELL to raise awareness of industrial safety and accident prevention and mitigation issues. The LAMP program used the following steps to further develop support for the APELL process and strengthen accident prevention and mitigation systems in Mexico:

1. Develop internal understanding of the baseline situation in the selected sites and initiate cross sector dialogue.
2. Execute regional training exercises to assist stakeholders discover their base of knowledge and preparedness and to generate enthusiasm for the LAMP program at the local level.
3. Institutionalize ties with senior level leaders from both the national and state governments.
4. Facilitate macro and micro planning sessions with appropriate levels of sophistication for targeted training.
5. Execute tailored training seminars and interventions to meet the needs of participating government and industry emergency response groups.
6. Identify, empower, and train emergency response leaders to allow them to solidify their leadership role and replicate LAMP activities in other sites in Mexico.
7. Work directly with community members to build community awareness and initiate the development of Local Emergency Planning Committees (LEPC).

The major activities undertaken to execute the methodology outlined above are described in Section IV and a full list of activities in chronological order is outlined in Appendix A.

Community Emergency Plan Implementation Flow Chart

Figure 1.



The following list gives an indication of the broad range of issues addressed in Mexico through the LAMP program:

- Risk assessments of plants and industrial complexes;
- Chemical emergency preparedness and accident prevention (CEPAP) training;
- First responder training in industrial fire safety and hazardous materials incidents;
- Medical response training for doctors, nurses, and paramedics;
- Hazardous material transport safety training;
- Mock emergency drills and simulations involving local response teams;
- Community awareness and LEPC development training;
- Media and public communication management consulting;
- Computer Aided Management of Emergency Operations (CAMEO) and information management training.

Apart from the impact achieved through conducting the activities outlined above, LAMP builds upon the APELL process by cultivating the direct involvement of accomplished and respected industrial and government leaders from the countries where the program operates. This high-level involvement is the second key component of the LAMP program.

A vital component of the success of a LAMP program is the leadership role required of a LAMP Country Manager. Mr. Enrique Bravo Medina served this role in Mexico. Mr. Bravo is a former Environmental, Health and Safety manager for multinational corporations as well as a professor at the National Autonomous University of Mexico. Being both an experienced corporate leader as well as respected teacher of chemical engineering and ecology, Mr. Bravo was well qualified to advance the LAMP program in Mexico. Mr. Bravo's corporate experience and contacts allowed him to navigate both government and industry hierarchies while his experience as a teacher and lecturer allowed him to contribute to the program as an effective facilitator for the many training seminars conducted. In short, Mr. Bravo's enthusiasm and energy allowed him to effectively carry out program activities and galvanize the support and cooperation of industry, government, and community groups.

The third central component of the LAMP program involves site selection. Since LAMP is designed to develop model industrial planning and response systems, site selection is critical to the overall success of the program. The basic criteria for a LAMP site requires that:

- Sites are found in an industrial zone where flammable, explosive or acutely toxic substances are produced or utilized in local production processes or transported through the community;
- A significant number of persons reside near the industrial zone and are, therefore, at risk;
- Effective disaster response capabilities exist or can be created;

- There is an expressed local concern and an interest in organizing an effective accident prevention, mitigation and preparedness program;
- Private as well as public industry leaders are committed to collaborative actions and can leverage other local institutions;
- LAMP exercises are likely to promote successful, collaborative actions by private and public groups; and
- There is potential to replicate activities from LAMP sites to other industrial areas in the host country.

In order to optimize LAMP Mexico program efforts and maximize impact while minimizing cost, WEC focused on the heavily industrialized state of Veracruz. Within the state of Veracruz, WEC focused on five key industrial centers: the Coatzacoalcos - Minititlan region; the Cordoba - Orizaba corridor; the city of Poza Rica; and the port of Veracruz. Extensive training was also held in Xalapa due to its political importance as state capital as well as its geographic centrality.

The primary reason for focusing on the state of Veracruz was need. Located on the eastern coast of Mexico, Veracruz spans over 800 kilometers from North to South. Over 70% of Mexico's petrochemical industry is located in Veracruz. Being such a major industrial center for Mexico, therefore, transportion, production usage, and storage of petrochemicals are of significant concern. Additionally, Mexico's only nuclear facility, Laguna Verde, is less than 100 kilometers north of the port of Veracruz.

Veracruz is not only prone to technological emergencies, but also to a number of natural disasters. Veracruz's coastal location makes it especially prone to hurricanes and tropical storms. Veracruz is also home to two of Mexico's active volcanoes which are in proximity to 27 communities. Finally, like much of Mexico, Veracruz is subject to regular seismic activity. The southern parts of Veracruz, including the heavily industrialized cities of Coatzacoalcos and Minititlan, are particularly prone to significant earthquakes. For all of these reasons, therefore, WEC selected Veracruz as an appropriate area to concentrate LAMP activities in Mexico. Additional background information on the sites within Veracruz follows.

The sister cities of **Coatzacoalcos and Minititlan** are located in the southern part of the state. Coatzacoalcos, the larger of the two has a population of 1,000,000. Coatzacoalcos is one of Mexico's principal east coast ports. Industry is centered largely around three of Mexico's largest petrochemical complexes in this area — Pajaritos, Cangrejera and Morelos. These complexes utilize nearly 200 different production processes.

The **Cordoba - Orizaba** corridor is centrally located on the western border of the state. Although an important industrial/petrochemical area, the Cordoba-Orizaba corridor is particularly prone to accidents involving the transportation of hazardous materials. Both cities are located on the central interstate between Mexico City and the port of Veracruz. Throughout the state of Veracruz people are concerned about issues involving the

transportation of hazardous materials. There have been highly publicized accidents involving casualties in recent years. Additionally, people realize that many more accidents have occurred that were not reported. Thus, the general public as well as the elected leaders of the Cordoba-Orizaba corridor were highly motivated to participate in the LAMP program. The population of these sister cities is roughly 400,000 people.

Poza Rica is a key industrial center in the north-central part of the state of Veracruz. Poza Rica is dominated by Petroleos Mexicanos (PEMEX) facilities. With the exception of those employed in the service and retail sectors, almost the entire working population is employed by PEMEX. The population of Poza Rica is roughly 600,000.

Finally, **Xalapa** was chosen as a central location to run seminars due to its political importance and geographic centrality. The proximity and access afforded by its location proved a cost effective way to reach out to the target communities and industrial sites chosen for the LAMP program.

These cities were also selected to emphasize different aspects of problems associated with similar hazards. The Coatzacoalcos-Minititlan area focused on traditional aspects of disaster prevention, preparedness and response at the plant level. In contrast, the Cordoba-Orizaba corridor is working to become more adept at responding to transportation accidents. Obviously both cities are concerned with both types of disaster scenarios, but their different emphases created excellent opportunities to share ideas and perspectives. By concentrating LAMP activities in one geographic region, reinforcement and replication of lessons learned was easier for the industries and communities involved.

The determination of LAMP's success in the selected sites relies on the visible changes seen during the life of the program in contrast to the baseline conditions found when the program began. The next section of this report covers the baseline indicators that relate to the LAMP program in Mexico.

III. BASELINE INDICATORS

Mexico's baseline indicators for the LAMP program were derived from World Environment Center's (WEC) assessments conducted during 1992. These initial assessments found that the following conditions reflected the basic traits of emergency preparedness for industrial disasters at LAMP sites in Mexico:

- **Government agencies and industry groups lack the technical know-how to effectively prepare and plan for technological emergencies.** This finding indicates that one of the primary goals for LAMP must be to promote technical capabilities within relevant emergency response and planning offices at the local, regional, and national levels. Prior to the LAMP program, the majority of planning efforts in disaster response correspond only to natural disasters.

- **There is a lack of coordination between government, industry and community leaders.** These three sectors are caught in a circle in which each one expects the other sectors to handle emergency response and planning, and none demonstrate a willingness to plan activities cooperatively. Government and industry groups sometimes even hinder each other's efforts in an attempt to strengthen their own autonomy and controll of emergency response management.

- **Government officials who have responsibilities both in the planning and operation of emergency response do not clearly understand the consequence and impact of man-made disasters.** This relates to issues of awareness and basic education which the Awareness and Preparedness for Emergencies at the Local Level (APELL) process addresses. Although APELL had been introduced in Mexico prior to LAMP, continued effort must be made to address issues of understanding risk at a basic level.

- **There is little attempt to develop public awareness in relation to the general population's safety.** This indicator shows that addressing issues of awareness and understanding among emergency response groups is only one aspect of the LAMP activities. The program also needs to operate at the grass-roots level and engage average citizens potentially effected by man-made disasters.

- **Industry response teams are not adequately equipped to address likely accidents, nor do they regularly conduct mock emergency exercises.** This last indicator points to an area where tangible improvements must be made. Without proper equipment, planning and rehearsal of disaster scenarios, those responsible for emergency response will be unable to accomplish their job of minimizing the effects of industrial disasters.

From these initial assessments, WEC developed performance indicators. WEC has used these performance indicators throughout the LAMP program as a benchmark for assessing

the program's progress toward its goals. These performance indicators are:

1) **Emergency Groups Formed**: Developed from the baseline assessment that previously very few mutual aid groups existed.

1.1) **Increased Preparedness**: Developed from the baseline assessment that the limited industry disaster preparedness efforts did not include local community government or community representatives.

1.2) **More Responders**: Developed from the baseline indicator that there existed few adequately trained emergency responders in Mexico.

1.3) **Site Replication**: Developed from the LAMP program tenet that the program will serve as a model for future efforts to increase emergency preparedness, response and mitigation.

2) **Increased Awareness**: Developed from the baseline assessment that there is limited local community involvement in emergency planning generally and almost none related to industrial accidents.

2.1) **Increased Awareness in the Community**: Based again on the assessment that previously the community had not been included in emergency preparedness, response and planning.

2.2) **Increased Awareness in Industry**: Based on the realization that aside from a few large multinationals, there existed little understanding in companies of the implications of a technological disaster

3) **Improved Response**: Developed from the assessment that there existed poor off-site emergency response infrastructure.

3.1) **Plan Testing**: Developed from the assessment that previously no community exercises were conducted.

3.2) **National Network**: Developed from the assessment that only natural disaster management strategies existed.

Section V. Impact, Sustainability, and Replication addresses the progress made against each of the baseline and performance indicators.

IV. ACTIVITIES

This section describes the major initiatives conducted in Mexico under the LAMP program and also gives a brief indication of the importance of each activity in terms of the overall objectives of the program. A complete list of all program activities is provided in Appendix A. Activities listed in Appendix A represent the actions taken by Mr. Enrique Bravo, LAMP Country Manager, to engage himself and others in the LAMP process. As discussed above, LAMP activities are designed and developed in accordance with the guidelines set forth by the United Nations Environmental Program's (UNEP) Awareness and Preparedness for Emergencies at the Local Level (APELL) process.

1. Develop internal understanding of the baseline situation in the selected sites and initiate cross sector dialogue.

The LAMP Mexico program began the LAMP process by studying the specific challenges faced by the communities designated within the state of Veracruz. This was accomplished through numerous meetings and conversations with key stakeholders in industry, government and community-based organizations. During this period WEC identified the differences existing between different groups and thereby came to understand how to best improve participation on all sides.

Outcome

This process forced all groups, especially government and industry, to confront their historic animosities and conflicts. Although by no means were all differences resolved, this initial phase of the LAMP prpgram was crucial in initiating a dialogue between the various stakeholders. It also was a key step in legitimizing the role of community representatives within risk management and disaster response. These initial dialogues were crucial to the overall effectiveness of the LAMP program and layed the groundwork for future collaboration between government, industry and community leaders.

2. Execute initial regional training exercise and simulation to help stakeholders discover their own baseline of knowledge and preparedness.

In December, 1993 WEC took action to move the LAMP program out of the government, industry and community leaders' offices and into the workplace and community where the potential risks of industrial accidents exist. WEC worked with local committees for mutual assistance (CLAM) in Coatzacoalcos and Veracruz to hold an extensive training seminar and full simulation of a hazardous material transport accident. The training portion of the event covered a wide range of issues relating to emergency response, including: containment of fire and explosions; transport of hazardous materials; the importance of

cooperation between industry, government and the community; emergency medical response; classifications of protective equipment for chemical emergency response; and, methods for conducting community and industrial risk assessment. The simulation allowed local first responders and the medical community to apply their training and receive critical evaluations from the experts invited by WEC. Both the training and simulation received significant media attention.

The twelve trainers and simulation experts who conducted the seminar and observed the simulation exercise came from a wide range of U.S., Canadian and Mexican organizations, including: Texas Engineering Extension Service (TEEX), The United Nations Environmental Programme (UNEP), The Centers for Disease Control and Prevention (CDC), the Mexican National Association of the Chemical Industry (ANIQ), Veracruz Civil Protection; Celanese Mexicana; and the U.S. Environmental Protection Agency (EPA). Other local organizations also provided technical assistance, training equipment and materials. The seminar was attended by 150 participants from industry, the medical community, government organizations and the community.

Outcome

The training and simulation served to demonstrate the current strengths and weaknesses of the local preparedness and response. The exercise further served to generate excitement and interest in the LAMP program by empowering participants with a greater understanding of the issues involved in disaster prevention, preparedness and mitigation, as well as educating the community that the environmental and health risks associated with industrial development can and should be effectively managed.

A significant breakthrough for the LAMP program was industry's willingness to take the lead in Coatzacoalcos' first community wide emergency response drill. Individual companies previously held exercises internally, but never conducted a coordinated community response activity involving overlapping participation from different companies, government response groups, hospitals, and other external stakeholders.

Following the seminar, industry leaders invited the international experts and trainers to visit their facilities. These meetings were successful in providing an open, private dialogue between the local industry leaders and the international experts. This provided WEC with greater insight and understanding of existing conditions at local industry sites. More importantly, it gave industry leaders an opportunity to speak candidly on issues of particular concern to their companies.

Another key outcome of this seminar was the identification that the medical community of Veracruz could serve as a powerful voice for the community in discussions with government and industry leaders.

3. Cultivate and formalize ties with senior level representatives of both national and state governments.

Realizing the importance of LAMP, and responding to the favorable reaction from community members, WEC formalized its relationship with the Federal and State governments of Mexico via two accords.

Accord between the Secretariat of the Interior and WEC

The first accord was signed between the Secretary of the Interior, Dr. Jorge Carpizo McGregor, and WEC CEO, Antony G. Marcil, in April, 1994. The accord states that WEC will assist the Secretary of the Interior to:

- Develop strategies to prevent, mitigate and respond to chemical accidents;
- Outline and implement action plans to increase community awareness;
- Create a communication system to manage a response to a chemical accident; and
- Learn from the incidents that do occur (analyze what went wrong, and ensure the same mistakes are not repeated in the future.)

Outcome

As a result of this accord and WEC's other activities, the Secretary of the Interior:

- Identified a list of high priority sites throughout Mexico to work with in the future. This was developed in part to assist their efforts to transfer the experience of Veracruz to other parts of Mexico;
- Created a National Advisory Committee to analyze chemical risk in Mexico. The LAMP Country Manager was asked to serve as one of the ten committee members;
- Committed itself to sending a representative to every LAMP event to assist in the transfer of information and ideas generated in the LAMP program to other parts of Mexico;
- Revised the National Atlas of Risk to include technological risks; and
- Now conducts a formal review of the LAMP program in its yearly National Civil Protection Week and Conference. This serves as an excellent method to share and replicate the successes of the LAMP program.

Accord between the State of Veracruz and WEC

A second accord was signed between WEC and the State Government of Veracruz. Signed by the Governor of Veracruz, Patricio Chirinos, and WEC CEO, Antony G. Marcil, the accord establishes WEC will assist the State Government of Veracruz to:

- Improve coordination between government agencies, corporations and the community during emergency preparedness and response;

- Develop a coordinated state wide system for civil protection in Veracruz; and
- Conduct training courses on managing hazardous materials, the safe transport of chemicals, risk analysis, and community awareness.

Outcome

As a result of this accord and WEC's other activities, Veracruz:

- Created the first municipal LEPC's in Mexico;
- Wrote and publicly published a five year plan for dealing with technological and natural risks;
- Included WEC in the State Civil Protection Committee;
- Established an internal training course, and training program for government employees on technological emergency prevention, preparedness and mitigation; and
- Developed a state risk atlas containing both technological and natural risks.

Finally, both accords served to institutionalize WEC's role in industrial risk management and emergency prevention, preparedness and response. These accords ensure WEC a seat at the table despite political or personnel changes. Through this rare access to government it also grants WEC the opportunity to make sure that the LAMP program is not forgotten or otherwise impeded. These accords will also help WEC replicate the LAMP program in other industrial areas of Mexico, as they formalize WEC's role.

4. Facilitate both macro and micro level planning to define priorities for targeted training.

Building upon the two accords and the initial training efforts, WEC worked with key stakeholders to develop short and long-term plans for achieving LAMP objectives. These meetings laid out training areas where WEC could intervene and also assisted stakeholders in determining their own capacity to improve disaster prevention and preparedness internally.

Outcome

These meetings led to targeted training seminars as discussed below (see activity 5). These meetings also served to secure in-kind contributions of facility space and materials for the training seminars.

5. Execute specifically tailored training seminars and interventions to help develop technical capabilities.

WEC in conjunction with relevant local authorities developed and executed training programs around four principle areas: Medical training; CAMEO training; Hazardous materials transportation training; and, the APELL process and risk analysis.

Medical training

WEC organized three separate medical training seminars to provide Mexican medical personnel with a basic understanding of the roles, responsibilities, and risks associated with a medical intervention during a technological disaster.

First, in December, 1993 in Coatzacoalcos, two doctors — one from the CDC and the other a Mexican expert on medical disaster response — conducted a specialized training given to 50 medical personnel. The doctors also spent time visiting local hospitals and clinics to assess medical readiness.

Second, WEC organized a specialized medical workshop in Xalapa in June, 1994 on the medical community's role in disaster response. Instructors for this seminar included two medical professionals, one from Emergency Medicine at Emory University and the other a Mexican expert on medical disaster response. Approximately 100 medical professionals from throughout Veracruz attended the workshop.

WEC conducted a third medical workshop in February, 1995 entitled Diagnosis, Treatment and Management of Contaminated Patients with special emphasis on pesticide intoxication. Held in the Port of Veracruz, the seminar was conducted by two medical doctors from the U.S. Agency for Toxic Substances and Disease Registry (ASTDR). Forty medical professionals attended this training program.

Outcome

The medical experts provided much needed training and advice to doctors, nurses and paramedics involved in disaster response. The training sessions served to empower the medical community which then became more involved in the LAMP program. The doctors provided valuable suggestions for improving off-site emergency plans, documentation of chemical risks for morbidity and mortality, scenarios of likely disasters, and important actions during disaster response.

As a result of these activities, hospitals in Xalapa and Veracruz created decontamination rooms in their facilities based on the recommendations of these medical experts. Also, both of these hospitals adopted proper decontamination procedures for cases when a patient has been exposed to toxic chemicals.

CAMEO training

WEC conducted training seminars using computer-based tools to aid in disaster response, preparedness and mitigation. Training covered the use and effectiveness of:

- CAMEO (Computer Aided Management of Emergency Operations). CAMEO is a software system developed by National Oceanic and Atmospheric Administration (NOAA) and EPA to assist in planning for and responding to chemical accidents.
- ALOHA (Areal Locations of Hazardous Atmospheres). ALOHA software serves to plot gas clouds and serves as a dispersion model during gaseous chemical accidents.
- ARCHIE (Automated Resource for Chemical Hazard Incident Evaluation).
- SCRI (Modelos Atmosféricos para Simulación de Contaminación y Riesgos en Industrias) [Atmospheric Models for the Simulation of Industrial Pollution and Accidents]. SCRI is a program developed in Mexico to serve as a model for atmospheric dispersion of gas releases.

Outcome

The computer training resulted in greater understanding of the power and availability of computer software in disaster preparedness and response. Industry gruops at the LAMP sites are now operating these programs at their facilities and have initiated direct contact with the international organizations which produce these programs.

Hazardous material transportation training

In September, 1994 WEC developed and conducted a seminar in Xalapa called Safe Transport of Extremely Hazardous Materials. The seminar targeted industry operations managers and government first responders to assist them in coordinated response to hazardous materials transportation incidents. The courses were conducted by trainers from ANIQ, Secretaria de Comunicaciones y Transportes (SCT), TEEX, Transport Canada, the U.S. Department of Transportation (DOT). Approximately 150 industry, community and government personnel involved in hazardous material transport attended the first seminar. Topics covered in the seminar included:

- Hazardous materials transportation emergency response techniques;
- Mexican regulation relating to the transport of hazardous materials;
- Product identification and placarding;
- Chemical transportation and container inspection; and,
- Legal implications of a chemical accident.

Outcome

Veracruz Civil Protection reports a significant increase in the use of placarding following this activity. The CLAM's and LEPC's are planning initiatives to work with trucking

companies from outside of Veracruz who conduct business within their state so that safer standards can be used by as many companies as posisble.

The fire department of Xalapa established procedures for dealing with hazardous materials transport incidents. These procedures were disseminated by the Veracruz Civil Protection throughout Veracruz.

The fireman's association of the state of Veracruz also now has a regular column on a topic related to proper methods for dealing with some aspect of emergency planning, preparedness and mitigation. The LAMP country manager has on occasion assisted with these articles.

The APELL Process and risk analysis

WEC conducted several training seminars on the APELL process as well as demonstrating methods to assess and understand risk. Although the first such workshop was held in March, 1993 the two most important workshops are described below.

In May 1995, WEC conducted an APELL seminar in Poza Rica, Veracruz. The seminar required representatives from industry, government and the community to conduct table top exercises to simulate the actions needed to reduce the loss of life, property and the environment during a chemical accident. Attendees were split into groups to focus on four different aspects: the APELL process; the development of community awareness; the identification and evaluation of an emergency; and, emergency prevention, preparedness and response. Roughly 100 government, industry and community representatives participated in the seminar. This seminar was held at the PEMEX facilities of Poza Rica — Poza Rica's largest employer.

In September, 1995 WEC conducted an APELL seminar in Ixtaczoquitlan, a city located within the heavily industrialized Cordoba - Orizaba Corridor of Veracruz. The seminar trained representatives from industry, government and the community in risk assessment as well as in emergency prevention, preparedness and response. The seminar was attended by 70 government, industry and community representatives.

Outcome

The seminar in Poza Rica led to significant commitments from industry to the LAMP program. The director of PEMEX committed himself to implementing the recommendations generated in the seminar. PEMEX also suggested that WEC lead a community audit of their facilities to confirm their follow-through on the recommendations.

PEMEX's commitment to evaluate the current state of all PEMEX pipelines in the area is an important outcome of this activity. Since a significant portion of the community lies

close to one of PEMEX's many pipelines, this was an issue of special concern to the community,.

During the seminar it was also observed that PEMEX's internal readiness and response capability is quite high. However, it was of particular concern that the response capability outside of the facility was not adequate. PEMEX has committed itself to working with the community to improve the response capability outside the plant.

The seminar in Cordoba-Orizaba was similarly effective. The local Red Cross now has a leadership role in the CLAM. This is the first time a non-industrial organization has had such a role. The CLAM also developed procedures for, and gained consensus from both government and industry on, local emergency response to hazardous material transport accidents.

6. Identify, empower, and train leaders to institutionalize their leadership role and facilitate the replication of LAMP.

In December, 1994 WEC led a multinational delegation of senior emergency response leaders on a Local Emergency Planning Committee (LEPC) orientation in the US. The itinerary included visits to OFDA, the Chemical Manufacturers Association (CMA), the Federal Emergency Management Association (FEMA), EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO), CDC, the National Institute for Chemical Studies, TEEX' Spill Control Training Center, and meetings with LEPC's in Charleston, West Virginia and Pasadena, Texas. The Mexican participants were:

Mr. Juan Antonio Haaz Ortiz, CLAM and Safety Superintendent for Troy Industries, Coatzacoalcos
Mr. Rubén Darío Mendiola Solano, Chief of the State of Veracruz Civil Protection, Xalapa
Ms. Rosario Llado Castillo, Manager of Emergency Response, Secretariat of Health for the State of Veracruz, Xalapa
Ms. Georgina Fernández Villagómez, Chief of the Issues related to Chemical Risk Management, National Center for the Prevention of Disasters (CENAPRED), Mexico City, D.F.

Outcome

The U.S. study tour provided the participating officials an excellent opportunity to learn first hand about the process of establishing community based, local level emergency preparedness and chemical emergency planning in the U.S. The study tour also allowed participants to meet with U.S. experts and discuss methods for improving planning and emergency response systems in Mexico.

As a result of this study tour the National Disaster Prevention Center (CENAPRED) translated a video made by the Pasadena, Texas LEPC. The video shows how the LEPC

responded to a real technological accident. The video is now used in CENAPRED and LAMP training activities for evaluating response scenarios. CENAPRED is also in the process of translating a manual used in India it received from the Indian delegation. This manual is directed to first responders on proper medical treatment.

The Veracruz Secretariat of Health created special medical LEPC's throughout the state of Veracruz and developed a standard set of procedures for emergency medical response.

The Coatzacoalcos CLAM is in the process of implementing an inter-CLAM communication network to improve coordination during emergencies.

Civil Protection of the sate of Veracruz rewrote their five-year plan building on the new concepts they learned when visiting FEMA.

7. Work with the community to build greater awareness and develop LEPC's.

WEC made a concerted effort to increase both awareness and involvement of the community in disaster prevention, preparedness and mitigation at all of the LAMP sites in the state of Veracruz. WEC utilized government and industry leaders responsible for community involvement as instructors and facilitators in the LEPC creation process. As one part of this effort WEC developed and executed a series of workshops designed to both educate and empower local community members as well as to assist them in the development of LEPC's.

The first community awareness seminar was held in December, 1995 in Coatzacoalcos, Veracruz. WEC assisted the key stakeholders in local municipalities to understand both how to organize the LEPC's as well as to understand their potential scope. Trainers included a WEC expert on LEPC development, a representative of the Pasadena, Texas LEPC and a member of the state of Veracruz government. Approximately 75 local community leaders attended the workshop. Topics covered in the seminar included:

- The role of the community in emergency response;
- The formation of an LEPC;
- Training community leaders on the proper methods of communicating risk to the general public;
- Activities industry can conduct to protect the community; and
- Interaction between LEPC's.

The second community awareness workshop was conducted in the Cordoba - Orizaba Corridor and involved 30 community leaders.

In June, 1996 WEC and the state of Veracruz co-sponsored a third workshop in this commuinity awareness series in Xalapa, Veracruz. Roughly 120 individuals participated in

the seminar from organizations including universities, women's groups, NGO's and government offices concerned with issues relating to children, and industry CLAM's.

Outcome

The Coatzacoalcos seminar led to a number of concrete advances. First, 45 concerned women created the first Women Volunteers for Civil Protection chapter. Another important improvement in advancing community involvement was that the head of the local church attended the seminar and has become of a proponent of LAMP initiatives. The LEPC also reached out to students in an effort to improve general awareness following the seminar. A contest for students was conducted to develop a city-wide mascot for emergency response efforts.

Another significant result of the seminar was an increased awareness of the hazards relating to the numerous pipelines in the Coatzacoalcos-Minititlan area. Over 350 families in the barrio Nuevo Mundo agreed to be relocated to clear a 75 meter border on either side of a main pipeline.

In Orizaba, where relations were poor between community groups and industry and government, community organizations agreed to engage in constructive dialogue.

An exciting aspect of the Xalapa seminar is that trainees in the Coatzacoalcos and Orizaba seminars became trainers in the Xalapa seminar. These trainers did an excellent job and will serve as a valuable resource for future LAMP replication efforts.

8. Work with relevant groups to improve emergency response capability.

To help improve emergency response and to support the previous activities conducted under the LAMP program, WEC organized a seminar and emergency response drill in August, 1996 in cooperation with the state of Veracruz and the City of Coatzacoalcos. The seminar on Coordination Strategies and Emergency Response to Hazardous Materials was held in the City of Coatzacoalcos, Veracruz. In this event, the key institutions and personnel responsible for emergency response at the local level learned how to plan, evaluate and implement effective emergency response mock drill activities. Following the seminar a mock drill was conducted to allow patricipants to practice what they had learned.

Trainers included an incident command and airport disaster expert from the Laredo, Texas Fire Department, a disaster response expert from Nuevo Laredo, hazardous materials experts and other Mexican experts. Approximately 110 representatives from the principal response groups and institutions attended the seminar. The topics covered included:

- Identification and evaluation of industrial and transport risks;
- Identification of risks to the community;

- Teamwork in emergency response and use of the emergency response manual;
- Incident command;
- First on the scene procedures;
- Models to evaluate leaks, spills and explosions caused by hazardous materials;
- Containment and confinement;
- Protective equipment and clothing;
- Portable monitoring equipment; and
- Media management.

Outcome

The Coatzacoalcos seminar made significant contributions in providing information and training on the importance of all aspects of emergency response, from planning and coordination to the actual tasks involved in dealing with such disasters. In conjunction with the seminar, a transportation emergency drill was conducted in front of a main shopping center to test the coordination and response of the emergency response teams. This exercise was conducted with the participation of state and local Civil Protection offices, the city fire station, the Red Cross, the local hospital, the Social Security Institute, the Coatzacoalcos Chamber of Commerce, CLAM's, PEMEX, transit police, the Mexican Navy and Armed Forces, the federal highway police, and the local community.

Although post-evaluation of the exercise found that many mistakes were made, it was a success because it was the first effort made to coordinate response efforts between industry, government, business, and the local community. All parties involved have indicated their intentions to continue to improve emergency response for their city.

1. Local media looks on as first responders proceed to a simulated accident of a leaking gas train container - Coatzacoalcos, December, 1993

2. Responders work to seal tank car leak during the Coatzacoalcos drill activity.

3. Coatzacoalcos fire fighters discuss equipment preparedness with expert from TEEX.

4. Group developing message and identifying target groups and modes of presentation for their community during a community awareness workshop - Orizaba, December, 1995.

5. Colored smoke used to demonstrate effect of wind on leaking gas vapor during a mock drill exercise - Coatzacoalcos, August, 1996.

6. Burning car used in mock collision with gas tanker truck in a public area - Coatzacoalcos, August, 1996.

7. Medical responders attend to victims during mock drill activity - Coatzacoalcos, August, 1996.

8. Emergency responders practice decontamination of toxic exposure victims - Coatzacoalcos, August, 1996.

V. IMPACT, SUSTAINABILITY, AND REPLICATION

The LAMP Mexico program made an important contribution in the continuing effort to prevent the loss of human life, destruction of property or degradation of the environment due to technological disasters. During its four plus years of operation, the program achieved meaningful results that will continue to foster improvements in industrial safety and accident prevention and mitigation in Mexico. LAMP played a vital role in improving community awareness throughout the state of Veracruz and developed the tools to replicate these achievements to other industrial areas within Mexico.

LAMP's most important contribution involves changing industry and government's previous distrust of each other and of the community. In the LAMP sites the community is now playing a vital role in accident mitigation and prevention planning efforts. Through a sustained and committed approach to working with all parties involved, LAMP effectively ended the previous cycle of distrust and inneffective emergency planning.

The Local Emergency Planning Committees (LEPC) created in Veracruz are another vital contribution to the long-term efforts to develop emergency preparedness and mitigation capabilities. These LEPC's have developed a core set of concerned and capable members and have established the organizational infrastructure to ensure their sustainability.

As mentioned above, the benchmark of WEC's success during the LAMP program can be gauged in terms of performance indicators. The following list of performance indicators outlines the cumulative effect of the LAMP program.

1) **Emergency Groups Formed**: LAMP Mexico has been successful in developing LEPC's throughout the target area of the state of Veracruz. Furthermore, WEC strengthened the industrial Local Committees for Mutual Assistance (CLAM's) and facilitated the development of communication and coordination methods between CLAM's and LEPC's.

1.1) **Increased Preparedness**: A fundamental aspect of the LEPC and CLAM network developed by LAMP Mexico has been to include the community and local government. Furthermore, examples such as the First Chapter of Women Volunteers for Emergency Response also demonstrate a willingness by, and an acceptance of, the community being involved in emergency response.

1.2) **More Responders**: Through extensive and carefully tailored seminars WEC has trained a significant number of emergency responders in the state of Veracruz. Appendix C contains a complete list of the groups that have benefited from LAMP emergency response training activities.

1.3) **Site Replication**: There are numerous opportunities to replicate the LAMP program to other parts of Mexico. Several of these sites are discussed in detail below. Suffice it to say, however, LAMP has opened the door to numerous opportunities to broaden the scope of the program and expand the knowledge base in Mexico concerning technological disasters and risks.

2) **Increased Awareness**: A fundamental aspect of preparedness is awareness. The LAMP Mexico program has made a significant impact in this area. Beyond those directly involved in preparedness, prevention, and mitigation, LAMP has generally increased awareness in the communities where the program worked.

2.1) **Increased Awareness in the Community**: The LAMP program has developed a number of important organizations in its efforts to increase community awareness. As mentioned previously, the state of Veracruz is creating a number of LEPC's throughout the state as well as developing specialized groups such as medical LEPC's. Getting such a large number of people involved in disaster response is one effective method of assuring increased community awareness. WEC also worked directly with the community by encouraging the development of programs involving local schools and community organizations, or through the media coverage generated by LAMP activities. LAMP has also facilitated emergency response officials from government, industry and community organizations to reach out to their own communities on an ongoing and regular basis. Finally, the relocation of over 350 families from the perimeter of a pipeline near Coatzacoalcos is a clear example of the increased awareness within the community, as well as both government and industry, of the risk of a technological accident.

2.2) **Increased Awareness in Industry**: Appendix C lists over one hundred private sector businesses which have participated in LAMP training activities. Most of these companies also participated either in an actual disaster response simulation or a table top exercise. Industry in the targeted cities in Veracruz played an important role in developing local emergency response plans. Finally, an even greater number of companies have been approached by Civil Protection, or other government or community leaders, to ensure that local businesses understand the importance of community-wide response planning.

3) **Improved Response**: A national technological disaster preparedness plan is being developed by the Secretary of the Interior. The state of Veracruz and cities within Veracruz are also developing plans to deal with technological disasters.

3.1) **Plan Testing**: The LAMP program has led directly to the development and testing of emergency response plans. The initial and most recent seminars in Coatzacoalcos included full community wide simulations and response efforts. The involvement of community members in emergency planning scenarios is an important indication that improvement in the planning process is taking place.

3.2) **National Network**: Through the accord between WEC and the Secretary of the Interior and with the assistance of the National Technical Advisory Committee, WEC has

begun coordinating the activities of a number of organizations working to develop national networks. The National Center for the Prevention of Disasters (CENAPRED) is also working to develop better coordination between the four regional disaster response centers. The National Association of the Chemical Industry (ANIQ) is developing a chemical accident response network. Civil Protection is working to develop a network of CLAM's and newly developed LEPC's.

At the close of the LAMP program, all indications show that significant replication is already occurring. The state of Veracruz is taking an activist position towards sharing its newly developed local level accident mitigation and prevention skills with other states and regions. The accord signed by WEC and the state of Veracruz will continue to give WEC personnel regular access to state officials responsible for LAMP related activities. The accord signed between WEC and the Secretary of the Interior will continue in effect until the year 2000. As discussed previously, this accord provides WEC a leadership role in emergency response and planning in Mexico. It also ensures the Secretary of Interior's continued role in developing local level community awareness programs.

To cultivate future LAMP sites the LAMP Country Manager met with, gave presentations to, and on occasion ran seminars on risk management and issues related to emergency response in industrial cities throughout Mexico. These events served to educate and generate interest in LAMP activities. These initiatives also serve to identify cities ready to take advantage of the LAMP program. Through these activities, WEC has identified six cities in Mexico which are suited for the LAMP program. Guadalajara, Mexico City, Monterrey, Puebla, Tampico and Villahermosa are all possible candidates for future LAMP activities.

The Secretary of Interior is working to transfer the experience gained in Veracruz to these cities. Still, however, much more needs to be done. Due to Mexico's chronic poverty and current economic crisis, these cities possess only limited resources for emergency preparedness and mitigation. Thus, the Secretary of Interior and WEC are actively seeking funding to continue the LAMP program. The context for potential LAMP programs in each of these cities is as follows:

- **Guadalajara**: In 1992 Guadalajara was jolted by a pipeline explosion which killed over 300 people and affected over 4 square kilometers of land. Key industry in Guadalajara includes petrochemicals, food processing, textiles, leather production, metal goods and cigarette manufacturing. Being the capital of the State of Jalisco, Guadalajara is the second most important city in Mexico in terms of its economic strength and size of population. Of special concern is the atmosphere of distrust created after the pipeline explosion between all three sectors: the community, industry and government. For this reason, WEC feels strongly that Guadalajara would be an excellent candidate for the LAMP program.

- **Monterrey**: WEC already conducted an APELL training seminar in Monterrey. The seminar was effective, although opportunistic in nature. Monterrey is a crucial industrial production center for all of Mexico, and in particular the industrial leader of Northern Mexico. Monterrey industries include steel and metals production, automotive productions, synthetic fibers, plastics, paper products and food processing. Industry is particularly concerned about the increasing population density which now extends right to their industrial plants fencelines.

- **Mexico City**: One of the three largest cities in the world with a population of over 20 million inhabitants, Mexico City is the political and industrial capital of Mexico. Industrial zones originally designed to be on the outskirts of the city are now surrounded by dense population. Mexico City is home to over 35,000 industrial facilities of all sizes, only 300 of which have risk assessment, emergency response or waste minimization procedures in place. Due to its size Mexico City also currently has significant problems with coordination and communication. Mexico City is especially prone to earthquakes which is of significant concern to industry.

- **Puebla**: Home to the largest factory in Latin America — Volkswagen's small car production facility, Puebla is an important industrial city just 130 km southeast of Mexico City. Puebla is experiencing rapid and unplanned growth. Puebla's industry includes automobiles, ceramics, glass, textiles and food processing. Puebla is located on key transportation routes from a number of petrochemical producing cities, including Veracruz, Coatzacoalcos and Villahermosa.

- **Tampico**: An important port on the Gulf of Mexico, Tampico produces rubber, textiles and a number of secondary petrochemical products. Safe transport of hazardous materials is of particular concern. Tampico also is troubled by communities situated directly adjecent to petrochemical facilities.

- **Villahermosa**: A large city in the state of Tabasco, Villahermosa contains significant petrochemical production facilities. It is made up of a largely rural population and is a relatively poor state within Mexico. Pipelines are of particular concern in Villahermosa.

As a result of the impacts achieved in Mexico and the needs identified in the Latin American region as a whole, WEC is utilizing the experience gained in Mexico as part of a separate program in Colombia and Chile. This new program is supported through funding from the Federal Office of Foreign Economic Affairs of the Government of the Swiss Confederation. Other opportunities for the LAMP program in the Latin American region exist in Venezuela and Peru.

VI. LESSONS LEARNED

During the four plus years of operation in Mexico, WEC has learned many lessons about the process of implementing the LAMP program. These lessons will serve both WEC and other organizations in implementing LAMP or similar programs in other parts of Mexico and the world.

- **LAMP is most successful when working with people and groups that are highly motivated to address the problems associated with the industrial accident planning, prevention and mitigation.** In conducting any development program it is too easy to see the final outcome as a function of the project alone. It is more accurate to say, however, that any prototype project, such as LAMP, is merely a part of the overall development process taking place. Success requires that project managers identify supportive stakeholders and work closely with those groups. Apart from the program resourecs brought to bear, it is mandatory that government and industry participants complement resources that serve project objectives. LAMP interventions in Mexico came at the right time and with the right compositions of local and national actors. The commitment to the LAMP/APELL process demonstrated by WEC's Mexican partners was the most important factor in the success in the program.

- **Effective intervention and sustainability of the LAMP program requires the leadership of a committed LAMP Country Manager.** A corollary to the first lesson learned, this observation relates to the critical role played by an in-country program leader. Since LAMP programs deal with myriad of issues ranging from the technical aspects of first responder roles to the political sensitivity regarding the public's "right to know," the experience, credibility and dynamism of the country program manager is imperative. In choosing the right person to spearhead similar programs, organizing groups should look for someone passionate about the underlying ideals and goals of the program, and not someone simply qualified to carry out the fundamental roles and responsibilities of the job. Mr. Enrique Bravo's commitment and zeal was infectious, and a vital factor in the success of the LAMP program in Mexico.

- **The LAMP process requires a multi-year commitment.** Development assitance programs often generate initial excitement, followed by a realization that the systemic changes sought are not easily accomplished. Only through the long-term commitment and with the leadership of the LAMP Country Manager can LAMP programs be effective. In Mexico, WEC cultivated a committed core of capable and dedicated individuals who internalized the LAMP program's values and goals as there own. The time and commitment that it takes to build such support for a program should not be forgotten.

- **Competition breeds advancement.** Throughout the selected LAMP countries, a healthy competitive spirit motivated communities over time to compete with one

another to make progress. The LAMP Country Manager effectively related success stories from one city to encourage other cities to follow the example. Geographic proximity, and other similarities assist in breeding this productive competition as well.

- **The development of prototype systems that can be replicated throughout the country requires that LAMP works intensively at a few selected sites.** For strategic planning and performance monitoring, there is a need to concentrate LAMP program activities at one location to obtain maximum impact and enable full program completion for replication at other sites. Once the first site begins the LAMP process, other sites may be added on a selective basis. In Mexico, the cities of Poza Rica, Cordoba, and Orizaba were added only when Coatzacoalcos and Veracruz had proceeded to a point where they served as an example to the other cities.

- **Institutionalizing contacts with governmental bodies pays rich dividends in efficiently managing the LAMP program.** The formal accords signed in Mexico were instrumental in the success of the LAMP program. By not having to constantly reestablish the program with different government and industrial organizations, the accords lessened the influence of personal politics and prevented the program from being co-opted to suit individual political ends. The accords also secured WEC a seat at the table. This security made it easier for the LAMP Country Manager to be frank and candid in his assessments of both government and industry.

- **When confronted with long standing and wide ranging historical animosities there is great value in empowering a third party to serve as a balance and face-saving link between previously contentious organizations.** In Mexico significant progress was made by empowering the well respected medical community to take a greater role in emergency response planning. The medical community provided an effective counterbalance to the traditional power struggle between industry and government.

- **Education is the cornerstone of any effective development program.** In Mexico the LAMP program proved that a little education can empower many people. Communities, industrial employees, and the press in Mexico began to refuse to accept that accidents are a routine aspect of industrialization. This realization, combined with the knowledge provided by LAMP on how they can constructively assist disaster preparedness and prevention, will ensure that the lessons of the LAMP program will not be forgotten due to political expediency or industrial profits.

Appendix A

Chronological Summary of LAMP Mexico Initiatives

Date	Activity
April, 1992	The World Environment Center (WEC) opened a permanent office in Mexico City to serve as a base to develop programs to serve as a bridge for the exchange of information and expertise between governmental, industrial, non-governmental, and community-based organizations.
June, 1992	WEC held a Risk Analysis and Hazard Identification Seminar for the edible oils industry in Mexico City. The seminar covered the concepts and techniques required to evaluate risks to the environment associated with the industry. The program included instructors from Dupont, Applied Engineering and Science, and other consultants. There were 40 attendees from industry in the greater Mexico City area.
Fall, 1992	The LAMP Country Manager conducted a series of meetings with various key stakeholders in industry as well as government personnel at the national, state and local level.
March, 1993	WEC conducted a Responsible Care workshop to share and extend the principles already being implemented in the United States, Canada and Mexico to other parts of Mexican industry. The seminar was conducted in Mexico City and was attended by 50 representatives of Mexican industry. (The program was funded by the Government of Canada.)
March, 1993	In Monterrey, Nuevo Leon WEC conducted an APELL workshop. Representatives from the local government, industry and other concerned organizations participated in the workshop. The program included instructors from the CCPA, Environment Canada, UNEP, SEDESOL and Mexican industry. The program was attended by over 120 industry, government and community representatives. (The program was funded by the Government of Canada.)
June, 1993	President of WEC, Antony G. Marcil, accompanied President of Mexico, Carlos Salinas de Gortari, during a presidential review of important environment and development projects in the cities of Queretaro, San Felipe and Puerto Peñasco. The invitation recognized the important contributions made by WEC to improve the environment, health and safety of Mexican industry.

September, 1993 LAMP Country Manager attended a two week LAMP Coordinator program which included: attending a USEPA Hazardous Material Handling Course; observing an EPA Hazmat exercise in Kansas City, Kansas; and, participating in the International Process Safety Management Conference and Workshop held in San Francisco.

December, 1993 WEC conducted an extensive program on prevention and preparedness for emergencies at the local level in Coatzacoalcos, Veracruz. The program included a full simulation of a hazardous material transport accident. The training portion of the event covered a wide range of themes relating to emergency response, including: containment of fire and explosions; transport of hazardous materials; the importance of cooperation between industry, government and the community; emergency medical response; the types and uses of personal protective equipment for chemical emergency response; and, methods to conduct community and industrial risk assessment. Twelve trainers conducted the seminar from a wide range of US, Canadian and Mexican organizations, including: TEEX, UNEP, CDC, ANIQ, State of Veracruz Civil Protection; Celanese Mexicana; USEPA; and MSA de Mexico. WEC received technical assistance, training equipment and/or materials from: USAID/OFDA, USEPA, Civil Protection of Mexico, SEDESOL, ANIQ, CMA, CCPA, PEMEX, State of Veracruz Civil Protection, and other local organizations. The seminar was attended by 150 participants from industry, the medical community, government organizations and the community at large.

December, 1993 In coordination with the Coatzacoalcos seminar and simulation described above, WEC arranged for TEEX and UNEP representatives to visit local fire departments to view and discuss training and equipment requirements.

December, 1993 In coordination with the Coatzacoalcos seminar and simulation described previously, WEC arranged for CDC, UNEP, and Mexican medical specialists in emergency response to visit local hospitals and clinics (both public and industry) to access medical readiness and to give more directed training to individual medical facilities.

January, 1994 WEC developed a training video and manual on disaster response using the experts' guidance and training from the Coatzacoalcos seminar. The video also includes the Coatzacoalcos simulation with commentary on proper response techniques. The video and the training manual were produced both in Spanish and English. Both were then distributed throughout Mexico to various industrial, governmental and community organizations. The video and manual have also served as training tools for the LAMP programs in Indonesia, Thailand and India.

March, 1994 WEC sponsored a Risk Assessment Seminar focusing on the simulation and modeling of atmospheric affects of a chemical accident. The seminar, instructed by EPA and NOAA trainers, included an overview of CAMEO and ALOHA software systems. This seminar was conducted in WEC's Mexico City offices.

April, 1994 WEC produced a training video on Risk Analysis based on the seminar described immediately above.

May, 1994 SEGOB and WEC signed an accord on the planning and topics related to the mitigation and prevention of chemical accidents. The accord was signed by the Secretary of the Interior, Dr. Jorge Carpizo McGregor, and WEC President Antony G. Marcil. The signing ceremony was attended by more than 350 people involved in the prevention and mitigation of chemical accidents from throughout Mexico.

May, 1994 As a result of the agreement signed between SEGOB and WEC, a second accord was signed between WEC and the State Government of Veracruz. The accord was signed by the President of WEC and the Governor of Veracruz in Xalapa, Veracruz.

June, 1994 The LAMP Country Director spoke to the National Mexican Association of Health and Safety on "Emergency Response to Accidents involving Hazardous Materials" in Mexico City, D.F.

June, 1994 WEC conducted a seminar on Medical Response during Chemical Emergencies. The course, conducted by two medical doctors expert in chemical and mass casualty response, was developed exclusively for doctors and paramedics. Roughly 100 representatives of the medical community from throughout the state of Veracruz attended the seminar. The seminar was conducted in Xalapa, Veracruz.

July, 1994 LAMP Country Manager attended a two week LAMP Coordinator program which included: training visits to TEEX; a visit with the Sarnia, Canada LEPC; and, a visit to a CIBA chemical facility to view emergency preparedness measures. The LAMP coordinator meetings also serve as an invaluable opportunity to cross fertilize the various LAMP country programs.

September, 1994 In Xalapa, Veracruz WEC conducted a seminar on the Safe Transport of Extremely Hazardous Materials. The seminar also covered regulatory issues and the legal implications of a chemical accident. The course was conducted by trainers from ANIQ, SCT (Secretaria de Comunicaciones y Transportes), Transport Canada, US Department of Transportation and

from TEEX. The seminar was attended by approximately 150 industry and government first responders.

October, 1994 USAID/OFDA project evaluation team visited Mexico.

October, 1994 The LAMP Country Manager was invited by PEMEX to speak on "Risk Analysis in Industrial Installations" during PEMEX's First Seminar on Industrial Safety, Environmental Protection and Social Development.

November, 1994 The LAMP Country Manager gave a presentation entitled: "Toxic and Explosive Gas Clouds" to the Mexican Association of Health and Safety's 30th Annual Conference on Health and Safety in Mexico City.

December, 1994 LAMP Country Manager led a delegation of key stakeholders on a Local Emergency Planning Committee (LEPC) orientation in the US. The program included visits with FEMA, EPA, CMA, National Institute of Chemical Studies, and the LEPC of Pasadena, Texas. The multinational delegation, including representatives from India, Indonesia and Thailand, afforded participants with the opportunity to share experiences and gain new perspectives on local level emergency planning and response. The Mexican participants were:

Mr. Juan Antonio Haaz Ortiz, CLAM President (Local Committee for Mutual Assistance) and Safety Superintendent for Troy Industries, Coatzacoalcos.
Mr. Rubén Darío Mendiola Solano, Chief of the State of Veracruz Civil Protection, Xalapa
Ms. Rosario Llado Castillo, Manager of Emergency Response, Secretariat of Health for the State of Veracruz, Xalapa
Ms. Georgina Fernández Villagómez, Chief of the Issues related to Chemical Risk Management, National Center for the Prevention of Disasters, Mexico City, D.F.

February, 1995 WEC coordinated a medical seminar entitled: "Diagnosis, Treatment and Management of Contaminated Patients with special emphasis on Pesticide Intoxication." The event was conducted by two medical doctors representing ASTDR and was attended by 40 carefully selected representatives of the medical community. The seminar was held in Veracruz.

May, 1995 WEC catalogued its books and materials collection relating to the LAMP program to make them more accessible to industrial, governmental and community-based organizations.

May, 1995 WEC conducted an APELL seminar in Poza Rica, Veracruz. The seminar required representatives from industry, government and the community to conduct table top exercises to simulate the actions needed to reduce the loss of life, property and the environment during a chemical/technological accident. Attendees were split into four groups to focus on different aspects: 1) the APELL process; 2) the development of community awareness; 3) the identification and evaluation of an emergency; and, 4) emergency prevention, preparedness and response. Roughly 100 government, industry and community representatives participated in the seminar.

August, 1995 Citing WEC's success in cities within the state of Veracruz, LAMP Country Manager presented the LAMP program to the Industrial Association of Cuernavaca, Morelos.

September, 1995 WEC conducted an APELL seminar in Ixtaczoquitlan, a city located within the heavily industrialized Cordoba - Orizaba Corridor of Veracruz. The seminar trained representatives from industry, government and the community in risk assessment as well as in the prevention, preparedness and response to emergencies. The seminar was attended by 70 government, industry and community representatives.

September, 1995 The LAMP Country Manager gave a presentation entitled: "The Role of Civil Protection in Building Community Awareness" to the Civil Protection of Mexico City.

October, 1995 WEC, CENAPRED and a private consultant developed a training manual for distribution in Braille on the proper response to both technological and natural emergencies and on hazardous material handling for the National School of Mexico for the Blind. (Materials and reproduction of the manual was provided by IBM.)

October, 1995 LAMP/Mexico Country Manager gave a speech entitled "Identification and Evaluation of Risks in the Home and the School" to the National University of Mexico for the Blind, located in Mexico City.

November, 1995 CENAPRED executed the translation of a Pasadena, Texas LEPC video which covers a technological accident for use in CENAPRED and LAMP training activities. LAMP/Mexico coordinator assisted in translation and attached technical material. (Funded by CENAPRED.)

November, 1995 The LAMP Country Director met with the Civil Protection of the State of Veracruz and gave a presentation entitled "Coordination between Government-Industry-Community before an Emergency" to Civil Protection staff and community leaders.

December, 1995 WEC translated a video originally produced in English by USEPA on the development of LEPCs. WEC developed the Spanish version of the video to enhance its community awareness training program.

December, 1995 WEC conducted a seminar on Community Awareness in the State of Veracruz. WEC worked with experts from U.S. LEPCs to assist in the creation of LEPCs in the state of Veracruz. Building on WEC's experience in the US and India, WEC assisted the key stakeholders in local municipalities to understand both how to organize the LEPCs as well as understand their potential scope.

The first workshops were conducted in Coatzacoalcos, Veracruz involving 75 community leaders. The seminar resulted in numerous advances including the creation of the fist group of Women Volunteers for Civil Protection in Mexico.

The second series of workshops was conducted in the Cordoba - Orizaba Corridor and involved 30 community leaders.

June, 1996 The LAMP Country Director presented a speech entitled "Risk Analysis and the Possible Effects of a Technological Accident on the Local Community" at the 5th Symposium on Security Today in Monterrey, Nuevo Leon.

June, 1996 WEC and the State Government of Veracruz co-sponsored, a workshop on Community Awareness in Xalapa, Veracruz. The seminar was executed by WEC and the well-established LEPC of Pasadena, Texas. This seminar focused specifically on training participants on the process of effectively creating LEPCs for their own respective communities to address their own communities specific needs. Roughly 120 individuals participated in the seminar from organizations including: universities; women's groups; NGOs and government offices concerned with issues relating to children; industry (CLAMs); and, local, state and federal governments (Civil Protection, Health, SEGOB).

July, 1996 The LAMP Country Manager gave a presentation on chemical risk analysis to relevant members of the Civil Protection of the greater Mexico City area.

August, 1996 WEC organized a seminar on Coordination of Strategies and Emergency Response to Hazardous Materials and transport emergency response drill in Coatzacoalcos, Veracruz in cooperation with the Office of Civil Protection from State of Veracruz and the City of Coatzacoalcos.

Approximately, 110 participants received training on emergency response planning and procedures.

Note: Since April, 1995 the LAMP Country Manager has also participated in other activities and events supporting LAMP objectives in other parts of Latin America. These activities include UNEP sponsored APELL workshops in Chile and Venezuela, training for firemen at TEEX, and, through another WEC program funded by the Government of the Swiss Confederation, a hazardous materials transportation seminar in Chile and an APELL workshop in Colombia.

Appendix B

List of Contributing Experts

March, 1993 **Responsible Care Workshop**, Monterrey
Mr. Robert T. Boldt, UNEP Representative, Senior Vice President (Rtd.), Dow Chemical Canada
Mr. John Shrives, Senior Program Officer, Environment Canada
Ing. Jose Montemayor D., Director, ANIQ
Mr. David Thwaites, UNEP Representative
Dr. Allen Wells, CAER Administrator, Chemical Valley Emergency Coordinating Organization

December, 1993 **Seminar on Emergency Prevention and Preparedness**, Coatzacoalcos
Mr. Pete Binion*, Assistant Training Specialist, TEEX
Mr. Robert T. Boldt, Senior Vice President (Rtd.), Dow Chemical Canada
Mr. Don Carloss*, International Training Coordinator, TEEX
Lic. Mario Crespo Nofler, Veracruz Civil Protection
Ing. Leonardo Gomez Vargas, Manager of Logistics and Transport, ANIQ
Ing. Ernesto Kuri de la Cruz, Chief of Production, Celanese Mexicana
Dr. Scott Lillebridge*, Disaster Assessment and Epidemiology Section,CDC
Ing. Juan Antonio Medrano, CLAM President
Ing. Victor Montes de Oca, Independent Consultant
Ing. Pablo Nunuz Breton, MSA de Mexico
Ing. Gabriel Rodriguez Navarro, MSA de Mexico
Mr. Jim Staves*, EPA
Dr. Miguel Trevino, Independent Consultant

March, 1994 **Risk Analysis Seminar**, Mexico City
Ms. Mary Evans*, NOAA
Mr. Bill Finan*, EPA

June, 1994 **Medical Response during Chemical Emergencies**, Xalapa
Dr. Henry Siegalson*, Clinical Assistant Professor, Emory University
Dr. Miguel Trevino, Independent Consultant

September, 1994 **Safe Transport of Extremely Hazardous Materials**, Xalapa
Mr. Pete Binion*, Assistant Training Specialist, TEEX

* Indicates expert travel financed by OFDA funding.

Mr. Don Carloss*, International Training Coordinator, TEEX
Lic. Luis Felipe Riancho Segui, Director of Transport, SCT
Ms. Sharon McDonald*, Instructor, Transport Canada
Ms. Beth Romo, Office of Hazardous Materials, DOT

February, 1995 **Diagnosis, Treatment and Management of Contaminated Patients with special emphasis on Pesticide Intoxication**
Dr. Jerome Joyce*, ASTDR
Dr. Scott V. Wright*, Emergency Response Coordinator, ASTDR

May, 1995 **APELL Seminar**, Poza Rica
Ing. Evaristo Aguirre, Process Engineer, PEMEX-Poza Rica
Arq. Enrique Basañez Trevethan, Mayor of Poza Rica
Lic. Edmundo Cordero H., Subdirector of Special Programs, SEGOB
Dr. Georgina Fernandez, Head of Environmental Department, CENAPRED
Ms. Sherry Fielding*, Chemical Emergency Preparedness and Prevention Office, EPA
Ing. Mario Garza, Director, Sistemas Heuristicos
Ing. Leonardo Gomez Vargas, Logistics and Transport Manager, ANIQ
Ing. Juan Antonio Haaz Ortiz, Superintendent of Health and Safety, Troy Industrias (Head of Coatzacoalcos CLAM)
Ms. Kathleen G. Shimmin, Director, Office of Health and Emergency Planning, EPA
Mr. Robert Young*, UNEP Representative
Ing. Jesus Zagal Rodriguez, Independent Consultant

September, 1995 **APELL Seminar**, Ixtzczoquitlan
Dr. Georgina Fernandez, Head of Environmental Department, CENAPRED
Ing. Luis Carlos Flores Avilia, Manager, Procter & Gamble
Ing. Alberto Garza, Director, Sistemas Heuristicos
Ing. Leonardo Gomez Vargas, Manager of Logistics and Transport, ANIQ
Ing. Juan Antonio Haaz Ortiz, Superintendent of Health and Safety, Troy Industrias (Head of Coatzacoalcos CLAM)
Ing. German Izquierdo, Independent Consultant
Mr. John Morton, UNEP Representative
Ing. Juan Antonio Nemi Dib, Independent Consultant
Mr. V. Srinivasan, Project Manager, WEC
Mr. Eric Steinhauss, Environmental, Health and Safety, EPA Region VIII
Ing. Jesus Zagal Rodriguez, Independent Consultant

* Indicates expert travel financed by OFDA funding.

December, 1995 **Community Awareness Seminar**, Coatzacoalcos
Dr. Georgina Fernandez, Head of Environmental Department, CENAPRED
Ms. Elizabeth Gonzalez, Coordinator, LEPC Pasadena, Texas
Mr. V. Srinivasan, Project Manager, WEC
Ing. Margarita Yepez, Manager of Health and Safety, ANIQ

December, 1995 **Community Awareness Seminar**, Ixtaczoquitlan
Dr. Georgina Fernandez, Head of Environmental Department, CENAPRED
Dr. Elvira Santos, Director of Solid Waste Laboratory, UNAM
Mr. V. Srinivasan, Project Manager, WEC
Ing. Margarita Yepez, Manager of Health and Safety, ANIQ
Ing. Jesus Zagal Rodriguez, Independent Consultant

June, 1996 **Community Awareness Seminar**, Xalapa
Ms. Elizabeth Gonzalez*, Coordinator LEPC Pasadena, Texas
Ing. Raul Herrera Romo, Chief of Protection Civil Orizaba
Ms. Guadalupe Martinez Walter, Women Volunteers of Coatzacoalcos
Dr. Elvira Santos, UNAM
Mr. V. Srinivasan, Project Manager, WEC
Ing. Margarita Yepez, ANIQ
Ing. Jesus Zagal Rodriguez, Independent Consultant

* Indicates expert travel financed by OFDA funding.

Appendix C

List of Organizations Participating in LAMP Activities

Federal Government Organizations

Aeropuertos y Servicios Auxiliares
Caminos y Puentes Federales
Centro Nacional para la Prevención de Desastres (CENAPRED).
Desarrollo Integral de la Familia (DIF)
Dirección General de Protección Civil de la Secretaría de Gobernación
Ejercito Mexicano
Instituto Mexicano del Seguro Social
Instituto Nacional de Ecología
Liconsa

Secretariats

Secretaría de Comunicaciones y Transporte
Secretaría de Desarrollo Social
Secretaría de Desarrollo Agropecuario Forestal y Pesquero

State Government Organizations

Comisión Estatal de Agua y Saneamiento
Dirección General de Protección Civil del Departamento del Distrito Federal
Secretaría de Salud Tampico

State Civil Protection

Protección Civil Morelos
Protección Civil Aguascalientes
Protección Civil Oaxaca
Protección Civil San Luis Potosí
Protección Civil, Tabasco
Protección Civil, Veracruz

Local Government Organizations

Procuraduría Federal de Protección al Ambiente, Monterrey, N. L.
Secretaría del Medio Ambiente, Recursos Naturales y Pesca, Veracruz, Ver.
Procuraduría Federal de Protección al Ambiente, Xalapa, Ver.

Local Civil Protection

Protección Civil Agua Dulce, Ver.
Protección Civil Ángel R. Cabada, Ver.
Protección Civil Banderillas, Ver.
Protección Civil Cazones, Ver.
Protección Civil Coatepec, Ver.
Protección Civil Coatzacoalcos, Ver.
Protección Civil Córdoba, Ver.
Protección Civil Cosoleacaque, Ver.
Protección Civil Fortín, Ver.
Protección Civil Huatusco, Ver.
Protección Civil José Azueta, Ver.
Protección Civil Martínez dela Torre, Ver.
Protección Civil Misantla, Ver.
Protección Civil Nanchital, Ver.
Protección Civil Orizaba, Ver.
Protección Civil Panuco, Ver.
Protección Civil Paso de Oveja, Ver.
Protección Civil Poza Rica, Ver.
Protección Civil Río Blanco, Ver.
Protección Civil Veracruz, Ver.
Protección Civil Xalapa, Ver.
Protección Civil Xilotepec, Ver.

Local Secretariats of Health

Secretaría de Salud Coatzacoalcos, Ver.
Secretaría de Salud Córdoba, Ver.
Secretaría de Salud Poza Rica, Ver.
Secretaría de Salud Río Blanco, Ver.
Secretaría de Salud Sn Andrés Tuxtla,Ver.
Secretaría de Salud Veracruz, Ver.
Secretaría de Salud Xalapa, Ver.

Fire Departments

Cuerpo de Bomberos, Orizaba, Ver.
Cuerpo de Bomberos, Veracruz, Ver.
Cuerpo de Bomberos, Xalapa, Ver.

Non-Governmental Organizations

Clínica de Oncología y Radioterapia Cruz Ámbar
Cruz Roja Mexicana, Coatzacoalcos, Ver.
Cruz Roja Mexicana; Del. Córdoba, Ver.
Cruz Roja Mexicana; Del. Orizaba, Ver.
Cruz Roja Mexicana; Del. Xalapa, Ver.
Cruz Roja Mexicana; Del. Poza Rica, Ver.
Cruz Roja Mexicana; Dirección General.
Escuadrón Rescate de Urgencias Médicas.
Parroquia Sagrado Corazón de Jesús.
Rescate Alta Montaña.

Academic Insitutions

CETIS #79, Coatzacoalcos, Ver.
Tecnológico de Monterrey
Tecnológico de Orizaba
Secretaría de Educación y Cultura
Universidad Autonoma de México
Universidad Veracruzana

Industry

Agronitrogenados, S. A.
Alambrados Automotrices, S. A.
Amilumex
Asertec, S. A.
Asesoría Ambiental Industrial
Asesoría Ecológica Industrial
Autotransportes Especializados GAMA
BASF Mexicana, S. A.
Bertha Campos Consultores
Bimbo
Biotec de Xalapa, S. A.
Café Internacional de Córdoba
Cafes Industrializados de Veracruz
Celanese Mexicana, S. A.
Cementos Apasco
Cemex Monterrey
Cenia
Cenia Monterrey
Centro de Enlace Profesional
Cerveceria Cuauhtemoc Moctezuma
Chrysler Saltillo
Ciclopafest
Ciepac
Cifunsa
Cloro de Tehuantepec
Colgate - Palmolive
Complejo Escolin
Concretos Apasco
Dicotec, S. A.
Dinamica
Dirona
Ecolab, S. A.
Embotelladora Tropical Orizaba
Empaques de Cartón Titan. Catalizadores Salhmon
Fábrica de Chocolates La Azteca.
Fábrica de Jabón La Corona
Fenoquimia, S. A.
Fermentaciones Mexicanas
Fluidos Ingeniería
Gamatek
Gasolinera Barrio Nuevo, S. A.
Grupo Inser
Grupo Pryc
Helber de México
Hylsa
Industria Cydsa - Bayer
Industrial Patrona de Córdoba
Industria Química del Itsmo, S. A.
Industrias Resistol
Industrias Vinícolas Domecq
Ingenio San José de Abajo
Ingenio San Miguelito
Internacional Química de Cobre, S. A.
Invenova
ISQUISA, S. A.
Itsemap
Kimberly Clark de México
Linde de México
Maquinaría de Veracruz
Mave México, S. A.
Merck México
Met-mex Peñoles
Microanálisis Toxicológicos
Minetec, S. A.
Nacional de Conductores Eléctricos
Nissan Mexicana
PEMEX Altamira
PEMEX Cosoleacaque
PEMEX Gas y Petroquímica Básica.
PEMEX Escamela.
PEMEX Pajáritos.
PEMEX Petroquímica
PEMEX Poza Rica
PEMEX Refinación.
PEMEX Tabasco
Productores de Envases Metálicos.
Productores Industrial
Productos Químicos Naturales, S. A.
Productos Químicos Coin, S. A.
Protección Empresarial del Altiplano
Protexa Industrias
Química A, B, C., S. A.
Reacciones Químicas
Refinería Lazaro Cardenas
Sabritas

Servicios de Ingeniería y Consultoría Ambiental
Silices de Veracruz
Syntex
Talleres y Aceros
Tereftalatos Mexicanos, S. A.
Termo Eléctrica
Tetraetilo de México
Trans Astros Internacionales
Transportadora Internacional AREN
Transportadora y Distribuidora Isabel
Transportes Especializados del Golfo de Veracruz
A. W. Troy de México
Yesera Monterrey

Appendix D

LAMP Activities by City

Coatzacoalcos
- Initial Seminar and Simulation, December, 1993
- Medical Training in Xalapa, June 1994
- Transport Training Seminar in Xalapa, September 1994
- Community Awareness Seminar, December 1995
- Emergency Response Seminar and Simulation, August 1996

Poza Rica
- Medical Training in Xalapa, June 1994
- Transport Training Seminar in Xalapa, September 1994
- APELL Seminar, May 1995
- Community Awareness Seminar in Xalapa, June 1996

Veracruz
- Medical Training in Xalapa, June 1994
- Transport Training Seminar in Xalapa, September 1994
- Special Pesticide Medical Training, February 1995
- Community Awareness Seminar in Xalapa, June 1996

Cordoba-Orizaba
- Medical Training in Xalapa, June 1994
- Transport Training Seminar in Xalapa, September 1994
- APELL Seminar, September 1995
- Community Awareness Seminar, December 1996

Appendix E

LAMP Program Goal, Objectives and Results

The goals, objectives and designed outcomes for the LAMP program are listed below:

- Goal: Reduced loss of lives, human suffering and property damage from technological disasters.
- Objective No. 1: Effective prototype technological accident prevention and mitigation programs established in each country.

  Result No. 1.1: Increased disaster preparedness and prevention in selected high-risk communities.
  Result No. 1.2: Increased number of trained technological accident responders.
  Result No. 1.3: Replication of successful technological accident prevention, mitigation and preparedness activities to other high-risk urban centers.

- Objective No. 2: Increased awareness of chemical risks and greater participation by government officials, industry officials and public in the preparation of emergency response plans for target communities.

  Result No. 2.1: Increased community involvement in technology disaster prevention and emergency preparedness and response for defined accident scenarios.

  Result No. 2.2: Increased industry adoption of emergency preparedness and response plans.

- Objective No. 3: Improved response to technological emergencies and natural disasters.

  Result No. 3.1: Periodic and regular testing of local emergency preparedness and response plans by computer simulation, desktop exercise, and live emergency drills.

  Result No. 3.2: Strengthened national and regional technological disaster response networks.

Appendix F

LAMP Mexico Impact Table

Performance Indicators	Baseline	Cumulative	Final Quarter Activities
1. Emergency Groups Formed	Some industry mutual aid groups (CLAMs)	Stronger links established between CLAMs & LEPCs	
1.1 increased preparedness	No local community representatives (government & public)	Veracruz State, especially Coatzacoalcos & Orizaba	
1.2 more responders	Few trained emergency responders	Medical & hazmat response training conducted in Veracruz State & Mexico City	
1.3 site replication		Monterey & Guadalajara are next, 11 new towns/cities in Veracruz are potential sites (see 2., below)	
2. Increased Awareness	Limited local community involvement in Emergency Planning	Improved local government & community awareness in Veracruz State	
2.1 by community		Coatzacoalcos, Poza Rica, Veracruz City & Xalapa	
2.2 by industry	Only large firms have on-site emergency plans, none have off-site plans	Large firms have both on-site and off-site emergency response plans; most medium & small firms have on-site plans, integrating off-site plans	
3. Improved Response	Poor off-site Emergency Response infrastructure	Improved medical & hazmat response in Veracruz State	
3.1 plan testing	No community exercises conducted before	Full emergency exercise in Coatzacoalcos; desktop exercise in Poza Rica	Emergency exercise in Coatzacoalcos in August. Emergency exercises scheduled for Cordoba-Orizaba in October
3.2 national network	SINAPROC in place for natural disasters	CENAPRED utilizing & managing LAMP program technology to plan for chemical disasters; also, disseminating this information	